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Winter 12-5-2020

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### Recommended Citation

Kellen, MacKenzie and Saxena, Deepak, "Calm my Headspace: Motivations and Barriers for Adoption and Usage of Meditation Apps during Times of Crisis" (2020). *ICEB 2020 Proceedings*. 43.

<https://aisel.aisnet.org/iceb2020/43>

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## **Calm my Headspace: Motivations and Barriers for Adoption and Usage of Meditation Apps during Times of Crisis**

(Full Paper)

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### **ABSTRACT**

Meditation applications for smartphones have been steadily growing in popularity. During the current Coronavirus pandemic, usership of various meditation apps has grown to reach record levels. This study explores the motivations for and barriers to adoption and usage of meditation apps during times of crisis. The study is based on qualitative, semi-structured interviews conducted with seventeen participants. The interviews were audio recorded, transcribed verbatim, and coded using the NVivo software. Inductive thematic analysis identifies five themes: job-related factors, changing lifestyles, psychological conditions and worries, perceived outcomes, and price. All themes except for pricing were found to be motivators for use, while price was deemed a barrier to use. The themes align with the constructs from the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT), and the Diffusion of Innovation (DOI) Theory, providing some useful guidance to meditation app providers.

*Keywords:* Meditation app, mindfulness app, motivation, barriers, calm, headspace.

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### **INTRODUCTION**

Meditation is an ancient practice that recently has seen an uptick in popularity in Western countries. This is in part due to the creation of a vast library of dynamic mobile applications (apps) that have transformed traditional meditative processes into accessible courses available at your fingertips. Between 2010 and 2020, record numbers of meditation apps were released in the iOS and Android app stores, with more than 1,500 meditation and mindfulness apps currently available (McGroarty, 2019). One such app, Headspace, launched in 2010, has thirty-five million users in 190 countries and earned \$56 million in revenue in 2019. Similarly, Calm, founded in 2012, reports over twenty-six million users with fifty-thousand new signups each day, and an estimated \$92 million in revenue in 2019 (Williams, 2020). These strong growth figures illustrate the popularity and draw of meditation apps.

In the year 2020, the growth in users of meditation apps has not only continued but also has been intensified by the current Coronavirus pandemic. Meditation and mindfulness app downloads in the iOS app store reached a weekly record of 750,000 during the week of March 29<sup>th</sup>, a twenty-five percent increase from one-month prior (Lerman, 2020). Increased societal fears, uncertainties, stress and anxiety levels, likely connected to the global spread of the pandemic, served as a catalyst for the jump in meditation app downloads.

This study aims to explore the factors that motivate or turn away millennial-aged individuals from using meditation apps during times of crisis. Specifically, the study addresses the following research question: *What are the motivations and barriers for the use of meditation apps during times of crisis?* In support of this research question, the remainder of the paper is organized as follows. Next section provides theoretical foundation of this study by discussing the benefits of meditation, and user perceptions and motivations for usage of health-related apps. This is followed by a discussion on research methodology employed in this study. Subsequent section outlines the themes identified based on the analysis. Thereafter, the findings are interpreted in light of relevant theories. This is followed by the practical implications of the findings. The concluding section outlines limitations and future work.

### **LITERATURE REVIEW**

#### **Benefits of Meditation**

The benefits of meditation have been extensively studied in clinical and non-clinical settings. Meditation has been found to increase concentration and compassion (Baer *et al.*, 2012; Bennike *et al.*, 2017), reduce depression, anxiety and psychological distress (Boettcher *et al.*, 2014; Chen *et al.*, 2012; Grégoire *et al.*, 2015), reduce insomnia (Ong *et al.*, 2008), and increase overall wellbeing (Howells *et al.*, 2016; Ivtzan *et al.*, 2016). Perhaps the most relevant to the current Coronavirus pandemic are meditation's potential benefits on patients' immune systems and in stress reduction and patient outcomes for healthcare professionals. Davidson *et al.* (2003) report significant increases in antibody responses to influenza vaccine among subjects who participated in an eight-week meditation training program compared to a control group. Grepmaier *et al.* (2007) find that psychotherapists practicing Zen meditation had significantly higher therapeutic evaluations. Shapiro *et al.* (2005) support the efficacy of an eight-week meditation program in reducing stress and increasing self-compassion among healthcare

professionals. As the Coronavirus pandemic crisis continues to circulate around the globe, hospital workers and healthcare professionals are reporting symptoms of burnout and stress at record levels. Meditation or mindfulness training may be helpful in alleviating the dangerous psychological burden that has been placed on medical workers through this pandemic.

### **Meditation Apps**

It is important to address the prior research done on mobile health and electronic health initiatives in order to contextualize the industry in which meditation apps have been released. Internet-based mindfulness treatment programs have been found to improve concentration (Bennike *et al.*, 2017) and decrease anxiety symptoms (Boettcher *et al.*, 2014). A meta-analysis by Portnoy *et al.* (2008) finds that Internet-delivered health interventions can treat a range of behaviors such as tobacco and substance use, and bingeing/purging episodes. Interestingly, remote delivery (Internet or mobile phone) of a mindfulness intervention does not seem to lessen its efficacy (Boettcher *et al.*, 2014). Wahbeh *et al.* (2014) examined preferences for the delivery of mindfulness meditation training and reported nearly half of all participants preferred the Internet format as their first choice, for reasons including convenience, privacy, and scheduling flexibility.

Studies have found that mobile apps are effective delivery mediums for mindfulness training. Morris *et al.* (2010) note that mobile apps can deliver psychotherapy and mental health interventions in a non-stigmatizing fashion to people who might not otherwise have accessed the therapy. Kazdin and Rabitt (2013) argue that mobile apps have the potential for success because of their reach, scalability, affordability, and flexibility. They are especially attractive with younger population since they often associate and express their identity with mobile devices (Longo & Saxena, 2020). Studies conducted with adolescents suggest that they find mobile phone delivery format relevant, familiar, and accessible (Chan *et al.*, 2017; Matthews & Doherty, 2011).

While many studies have been conducted on the efficacy of meditation practices, relatively less research is done on the motivators and barriers for the adoption and use of meditation apps. Laurie and Blandford (2016) report that enabling factors to use mobile meditation apps are positive attitudes towards mindfulness, realistic expectations, and positive social influences; barriers to use are busy lifestyles, lack of routine, and negative perception of mindfulness. Peng *et al.* (2016) find that the most common motivators to use health apps are social competition, intangible and tangible rewards, internal dedication and motivation. At the same time, some barriers to adoption are low awareness, lack of need, lack of app literacy, and cost. While other studies were conducted during normal times, this study seeks to investigate these factors during a time of crisis, using Coronavirus pandemic as a context.

### **METHODOLOGY**

Since the research question (*what are the motivations and barriers for use of meditation apps during times of crisis?*) is exploratory in nature, an interpretive research approach was deemed necessary to identify themes, relationships, and patterns within the qualitative data. Twenty-three participants were recruited via Instagram Story posted by the first author on her personal Instagram account in May 2020. The Instagram Story asked if any followers have used meditation apps during quarantine, and, if so, requested them to contact the author to participate in the study. The compensation for participation was entry into a raffle to win a \$100 Amazon gift card. Since the study focused on motivations for adoption and usage of meditation apps during times of crisis, the inclusion criterion was that participants must have used a meditation app at least five times during quarantine. Of the twenty-three participants who were initially recruited, six did not meet the inclusion criterion, so the final number of participants was seventeen. These participants differ from those in previous studies in that they were specifically recruited as preexisting users of meditation apps, as opposed to participants who were asked to use a meditation app for the purpose of the study. The participants' ages ranged from twenty to twenty-seven. Of the seventeen participants, thirteen were female and four were male. Except for one French participant located in France, the rest were American citizens living in the USA. Fourteen participants were college graduates who had been employed in full-time jobs, and three were still attending college.

All interviews were one-on-one, in-depth, and semi-structured in nature. The interviews started with basic questions about participants' experiences with health apps and meditation in general, and moved to more focused, sensitive questions at the end, such as questions regarding participants' personal experiences during quarantine and any emotions that were felt during that time. Both authors have used meditation apps for many years prior to the current study, and during the research design phase, engaged in an autoethnography to frame the questions that would probe participant motivations. Pre-structured interview topics included: previous experience with health apps, previous experience with meditation or mindfulness training, meditation apps that have been used in the past or currently use, patterns of usage with meditation apps, and personal experience during quarantine/lockdown. Because of the exploratory nature of the study, the questions were positioned as open-ended as possible in order to delve into *why* and *how* participants chose and subsequently used certain meditation apps. To retain a natural setting, no specific apps were recommended for the study and the participants used the apps they preferred. Table 1 shows the list of meditation apps used by participants, in order of their prevalence. Mimicking the observations from Williams (2020), Headspace and Calm remain two most popular choices.

Table 1: Meditation apps used by the participants.

App	Usage among participants	Used for
Headspace	11	Anxiety & stress management, focus, mindfulness
Calm	9	Sleep, focus, stress management
Peloton	2	Focus, mindfulness, anxiety management
Relax Melodies	2	Sleep, stress management
Waking Up	2	Philosophical guidance, stress & anxiety management
YouTube	2	Mindfulness
Balance	1	Focus
Meditopia	1	Focus, mindfulness
Soul Time	1	Spiritual guidance, mindfulness
Spotify	1	Stress & anxiety management

With health and safety considerations in mind during Coronavirus crisis, interviews were conducted over mobile phone. The first few minutes of each call were spent making casual talk in order to build rapport with the interviewee. The interviewer then described the purpose of the study, the topics that the interview would cover, and briefly talked about her own experience with meditation and meditation apps in order to build trust. The participants were encouraged to speak openly and honestly. Probing questions were also asked to follow up on any insights generated from the main set of questions. While each interview was recorded, notes were also taken to support the data collection process.

The audio recordings of the interviews were uploaded to NVivo for transcription and analysis. To avoid the occasional errors made by the software, each transcript was carefully read to correct the errors as part of data cleaning. While reading through each transcript, various notes, annotations, and memos were added to keep track of trends and themes that were becoming apparent. In the initial open coding, key primary themes emerged based on the number of occurrences within the data. Thereafter, axial coding was conducted in which subthemes were identified along with the relationships between themes and categories of data. Throughout the coding process, data extracts were constantly reorganized and rearranged to fit new themes and hierarchies that became apparent. Results of the thematic analysis are presented in the next section.

**ANALYSIS AND FINDINGS**

Figure 1 shows the major themes identified in the study, which are job-related factors, changing lifestyles, perceived outcomes, psychological conditions and worries, and price.

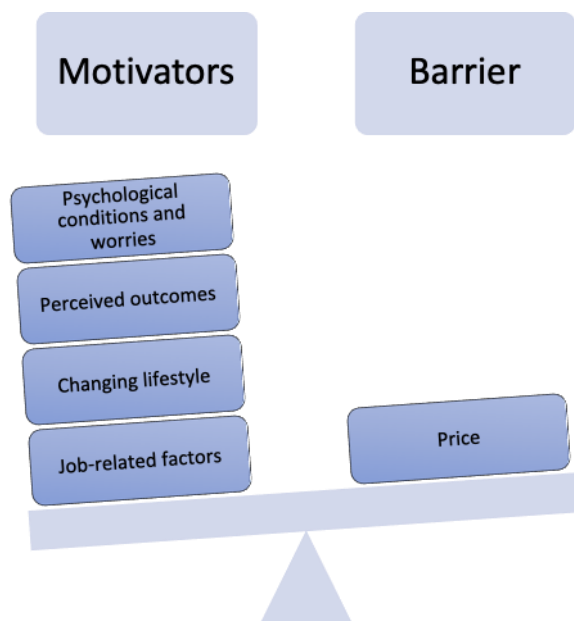


Figure 1: Motivator and Barriers of using meditation apps during a crisis.

**Job-related Factors**

At the time of the interviews, fourteen participants were working full-time or had been previously employed in a full-time position when the Coronavirus pandemic began. Motivators associated with job-related factors include subscription subsidized by employer, work stress, and layoffs.

### ***Subscription subsidized by employer***

Five participants had free access to an annual subscription to a meditation app that was subsidized by their employer. For these participants, the subscription was offered either by the employer directly, or through the health insurance provider. These participants noted that having access to a yearly subscription, free of charge, was a motivator for trying out the app, though not all of them remained consistent with their usage. As one participant notes:

I think if it wasn't being paid for, I might have downloaded and subscribed for a month, just to see what it's about. Definitely as long as it's supplied to me, I will absolutely continue to use it.

Some stated that because they were able to try out a subscription for free, they would be more likely to pay for a subscription themselves in the future. Of those who tried out the free subscription but did not continue, some acknowledged that they fell out of a routine with meditation altogether, while another stated that he had previously purchased a subscription to a different app that he liked more than the one offered by his employer. Regardless, of the five who had access to a subsidized annual subscription to an app, all had tried the app at least once. One participant describes the relationship between her employer-subsidized subscription and the increased stress that she and her coworkers felt during the early days of the pandemic:

I think it [the app subscription] definitely was in direct response to the pandemic. They [the HR department] understand it's been a more stressful time lately.

Many participants discussed utilizing their subsidized meditation app subscriptions to mitigate work-related stressors, which is discussed next.

### ***Work stress***

Work stress was discussed by many participants. Some worked in, or adjacent to, sectors and industries that had been negatively impacted by the pandemic, including hospitality, health, and airlines. In some cases, the participants in these sectors described how their client portfolios vanished 'overnight' and their subsequent scrambles to find business for their firms. Others discussed the long hours they worked as their jobs became busier with pandemic-related business, describing the expectations to be 'on call' at all times. In all cases of work-related stress, participants described this stress as manifesting in anxiety during daytime, or sleeplessness at night. These by-products of work-related stress were motivators for many participants to pursue meditation as a form of stress relief. Several other participants acknowledged that they used meditation as a break during the daytime, a respite from busy schedules and work stressors. One participant stated that if he felt stressed or anxious during work, he knew he could turn on a meditation and "chill out after that and get back to work and be more productive". Interestingly, one participant described how her meditation app usage dropped to zero during quarantine since the demands of her job increased and she became busier than ever before. However, she acknowledged that her history with meditation prior to the pandemic allowed her to become 'more aware' of fluctuations in her mental states and stress levels, noting that "I didn't necessarily meditate, but through different means I guess I was still able to do some form of self-care". This was only one of three instances in which a participant's meditation app usage dropped to zero, rather than increasing during quarantine.

### ***Layoffs***

Company layoffs was a theme that came up in several interviews. Participants described the stress and unease of layoffs occurring within their companies, seeing coworkers lose their jobs, and not knowing their own fates. Some participants, who were already laid off, discussed the difficulties they suddenly faced as being unemployed during the pandemic. Two participants said that losing their jobs in the beginning of the pandemic was the catalyst that spurred them to try a meditation app. As one participant describes:

I was laid off due to COVID, and I was feeling stressed out and felt like I needed to clear my mind. I had a lot of thoughts that were running through my head, about what I needed to be doing, you know, next steps, and to ease that, I looked into these apps. I think what triggered it was definitely losing my job.

Others spoke about the stress of watching coworkers being laid off and let go. One participant described constantly 'feeling scared', as his company had gone through several rounds of layoffs:

The pressure of my work performance, this crisis and how all of that could impact my performance, those were the main reasons I looked to meditation on a daily basis.

This participant acknowledged that he was uncertain about the future of his employment, but meditation helped to calm his uneasy thoughts.

### ***Changing Lifestyles***

As societies and communities around the world are making adjustments on a macro scale to accommodate the newfound risks of the Coronavirus, individuals are making adjustments at the micro level. Pre-pandemic lifestyles and routines have changed in countless ways as workers stopped going into their offices, businesses shuttered, and travel ground to a halt. Many participants discussed how they adjusted to this 'new normal' and how these changes affected their meditation practices. Subthemes that were noted within lifestyle changes include changes to living arrangements and restrictions on otherwise normal activities.

### ***Changes to living arrangements***

Changes in the living arrangements of participants were noted frequently during the interviews. Many talked about moving back home with their parents, either for a period of time during quarantine, or permanently. Participants who moved home permanently did so for a variety of reasons – to be with family during challenging times, lack of space for home office, or not

being able to afford rents. Participants described facing a loss of independence as they shared their personal spaces and altered their routines to fit into the homes of their parents. The majority who moved home stated that they increased their usage of meditation apps to cope with parental restrictions and living in a space that was not their own. One participant described how her mother's Coronavirus fears affected her while at home:

My mom is really intense about quarantining. She doesn't want me to see anyone, so I've been pretty isolated since February, super early in the pandemic. Meditation is what helps me break up the monotony, the isolation, and helps me have a routine.

In contrast, one participant stayed in his apartment throughout the initial quarantine period in his city and described the isolation and loneliness he felt as his roommates left to move back home with their families:

I just had a general feeling of both of my roommates being gone, and feeling a little down, feeling a little stressed out with work, and I was like, 'Okay, I'm not feeling as good as I would like to, and what can I do to improve that?'

He remembered what he had heard from friends over the years, attesting to the positive benefits of meditation, and said it was a combination of these two things (a suddenly altered living arrangement and recommendations from friends) that motivated him to try a meditation app during quarantine.

### ***Restrictions on otherwise normal activities***

A number of participants discussed changes to their lifestyles in the form of closures of offices, restaurants, bars, gyms, and yoga studios. These participants addressed the sudden void they felt as their "normal activities were taken away" as a result of the closure of these public spaces. Office closures and subsequently working from home came up in the interviews of every participant who was employed in a full-time position. Many said that they missed the social interactions of an office. One participant notes:

I'm used to working around a lot of coworkers in our office, and just having a more social setting. It's been a big adjustment working from home.

As the boundaries between working space and living space blurred, many participants turned to meditation to "break up the day" and create a routine during a time when normal routines were disrupted. Participants also discussed the boredom and excessive free time they faced as social spaces like bars, restaurants, gyms, and yoga studios closed due to pandemic restrictions. For many, this free time, coupled with being restricted to one's living space, encouraged meditation. As one participant describes:

I had so little going on with quarantine, and I was open to doing whatever I could to have new experiences. I had time on my hands, and I was happy to try something new and do something different.

Another participant spoke about how, with the absence of regular in-person yoga classes, she needed a new activity to create the same "mental feeling" that a yoga class provided:

Prior to COVID, I was lacking with my meditation, because I was going to yoga and grouping it all in the same category. And then when I couldn't go to yoga anymore, that's when I started meditating a lot more. Since COVID, I've got a lot more free time on my hands, as I think we all do, and it's forced me to look inwards.

Those who looked to meditation to fill a gap created by the absence of normal social activities reported varying results. Many discussed a sense of accomplishment they felt after meditating for multiple days in a row, while others stated that meditation seemed to make no difference on how they perceived their boredom and free time. Interestingly one participant reported her meditation app usage being dropped to zero throughout the entire quarantine period in her city because she "felt like [she] had nothing to meditate on. Nothing was happening". She felt that she would start meditating more regularly once quarantine restrictions lifted, as regular meditation had seemed to reduce her stress levels prior to the pandemic.

### **Psychological Conditions and Worries**

Another set common motivators were psychological conditions and worries that had either been pre-existing or resulting from the pandemic. Anxiety, stress, and insomnia were frequently discussed during interviews, and are presented here as subthemes.

#### ***Anxiety***

Symptoms of anxiety were mentioned by thirteen participants. Of those, several participants began using meditation apps prior to the pandemic because they were looking to calm anxiety symptoms. "When I went to college, I started to get some anxiety, and meditating totally helped with that", one participant notes. Two participants had meditation apps recommended to them by their respective therapists years ago. It is interesting to note that in both cases, these participants were initially against the advice of their therapists but acknowledged that they felt more motivated to meditate during the pandemic, as their anxiety levels had risen. Several other participants discussed using meditation apps in conjunction with therapy, medication or exercise. Two participants discussed creating a meditation practice to replace or work in tandem with their anxiety medications, with one noting:

As you decrease trying to medicate certain issues, there's a lot of behavioral therapy you can incorporate, and meditation has been pretty high up on the list of recommended ways to deal with general feelings of anxiety, outside of medication.

The combination of the therapy and meditation came up frequently during interviews; several participants talked about either currently seeing a therapist in addition to their meditation practice or expressing a desire to start seeing a therapist in addition to meditation. Others who may not have experienced symptoms of anxiety prior to the pandemic discussed feeling anxious during quarantine, and this was a motivator for them to try meditation. One participant recalls:

There was so much fear and anxiety, especially in March and April [2020], I needed to do something to take my mind off of the news.

Many spoke about how their anxiety levels had seemed to fluctuate over the course of the initial quarantine period, and their meditation app usage correlated with these fluctuations. One participant notes:

I don't have diagnosed anxiety or anything, but I noticed when I would feel more anxious and stressed, I definitely use the apps more.

Many participants who had tried meditation apps for managing anxiety reported perceiving a reduction in the strength and frequency of symptoms, even if it was temporary for some.

### **Stress**

Many participants turned to meditation to manage rising stress levels they felt had resulted due to the pandemic. In addition to the previously discussed job stress among participants, some reported feeling a constant level of general stress throughout the beginning of the Coronavirus outbreak and quarantine. One participant spoke about the difference between her stress management abilities prior to using an app, compared to now:

Before, in high school and early in college, I would get so overwhelmed and freaked out that I would cry. Now, I'm able to look at myself and say, 'You need to calm down.' I'm more aware of myself now.

Even if some participants did not turn to meditation apps specifically to handle stress, the majority reported using meditations for stress at least once. Several participants acknowledged that they had become motivated to meditate not just during "the bad times," but in future post-pandemic life as well, in order to manage stress once normal ways of life resume. One participant observes:

I want to use it all the time now, even when I'm not stressed, because the benefit of it comes out when you are so in that habit, and something that might normally make you upset, doesn't anymore.

Others echo this sentiment about using meditation in the future to maintain positive coping mechanisms for difficult emotions. Many participants felt there was overlap or a correlation between their stress levels and not being able to sleep at night. This is discussed in the next subtheme.

### **Insomnia**

A majority of participants turned to meditation apps to aid in sleeplessness and insomnia. As with the previous two subthemes, some participants acknowledged sleeping troubles that had existed prior to the pandemic, while others felt that sleeplessness was a new phenomenon that arose during the Coronavirus outbreak. One participant recalls:

I felt like my personal experience with stress, especially during quarantine, most definitely manifests in me having difficulty sleeping. I definitely get the most use out of the sleep features.

Others looked to meditation as a drug-free alternative to sleep aids like melatonin, and many reported falling asleep faster and feeling like they had gotten 'better' sleep on the nights they meditated. Many who used the Calm app talked about a feature called Sleep Stories, in which celebrities, athletes, and figures in popular culture read bedtime stories that are to be listened to in place of a meditation. This function was well-received by participants who had used Calm, and was a motivator in itself for some:

I kind of felt like I had gone through all of Headspace's programming by the time I stumbled upon Calm. And I wanted to hear someone else's voice besides the Headspace narrator. That's why I like Calm, is the variety of narrators, and the longer bedtime stories when I can't sleep.

Although the Sleep Stories were not designed as meditations, participants who used them reported similar feelings of calm, relaxation, and fewer intrusive thoughts. Nearly all the apps used by participants incorporate a sleep category into their functionality, however, Calm is the only app utilizing celebrity voices in its meditations.

### **Perceived Outcomes**

Many participants were motivated to use meditation apps because they were aware of the potential benefits of meditation. There was a range of positive results and benefits that participants perceived to be possible from meditation. As discussed in the previous theme, a number of participants hoped to mitigate symptoms of psychological conditions and worries like anxiety, stress, and insomnia. Some wanted to be 'more mindful' in their daily routines:

It was honestly something that I read about, having a morning routine and starting your day without thinking of your to-do list, but being mindful and present. I think being mindful helps with overwhelm in general, and it's hard to feel overwhelmed if you're taking things one day at a time. This helps me focus on a few small things that I can control.

Other participants felt that meditation would help them become less distracted and more focused. "I wanted to try it so I could improve my concentration", one participant notes. Some felt that meditation would help them filter out the distractions of modern life, like social media, text messages, emails, and phone calls:

I was noticing how I was plugged in constantly and I was trying to focus on multiple things at once, and I wanted to have a part of my day where I could be alone with my thoughts.

Productivity was another perceived benefit to be gained from meditation:

I thought it would help organize my thoughts, like make me more productive. I wanted to slow down to then feel like I could complete my tasks in a better way.

Several other participants discussed their hope to become more self-reflective through regular meditation. "I guess I wanted a ritual of sorts to unwind and reflect on the day and practice more gratefulness", one stated. When prompted about their initial

learning of these potential benefits, some participants felt that the apps' marketing and advertising had contributed to their beliefs about the benefits, while others acknowledged that it was simply general knowledge they had accumulated or been exposed to over the years. For some, it was through recommendations by friends and coworkers. Other participants referenced specific anecdotal evidence they had received about the benefits of meditation that motivated them to try out an app. One participant adds:

I know some pretty high-powered businesspeople that are super into meditation, and they make time for it every single day, even when they're in the office. They rave about the benefits, and I felt like it was almost a trait of successful people, that they meditate.

### Price

Most meditation apps follow a freemium pricing model, offering free trial periods and/or some basic functionality to entice users into paying for subscription. Participants took full advantage of these free periods by trying out different apps. When the trial periods ended, participants were forced into choosing one app to subscribe to. One participant recalls:

I was using the free trials of both Calm and Headspace, and when they ended, I felt like I could still get value out of Calm for free, but with Headspace they had barely any free content, which is why I chose to pay for it.

Price was identified as a barrier as the monthly subscription cost of some apps discouraged many participants. Interestingly, this also motivated the participants to seek other free options. Some looked for free content on streaming platforms like Spotify and YouTube: "I decided I didn't want to pay for any apps, because there is plenty of free content out there in the universe". Some participants acknowledged that their app usage tapered off or stopped around the time that the free trials ran out: "I was going to pay for a subscription, and then I didn't, and that's about when my usership dropped off". Many described their reluctance to pay for an entire year-long subscription, as they weren't sure if they would end up using the app consistently. "At the time, I wasn't sure I wanted to pay seventy-five dollars for something I wasn't sure that I would use", one said. Several participants who had been laid off during the pandemic expressed motivations to find free meditation content, as their financial status did not allow them to pay for a year-long subscription up-front. Overall, sentiments about the prices of different apps were negative; even those who paid for an annual subscription said they wished the prices were lower or that there was an app "that had everything for free".

## INTERPRETING THE FINDINGS

Since the benefits of meditation are already established in the wellbeing literature (e.g., Baer *et al.*, 2012; Bennike *et al.*, 2017; Boettcher *et al.*, 2014; Chen *et al.*, 2012; Grégoire *et al.*, 2015; Howells *et al.*, 2016; Ivztan *et al.*, 2016; Ong *et al.*, 2008), in this section the findings are revisited from an interdisciplinary perspective. The findings closely relate to three theories that are widely used to explain technology acceptance, adoption, and usage: The Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT), and the Diffusion of Innovation (DOI) Theory.

### Technology Acceptance Model

Two constructs from TAM, perceived ease of use and perceived usefulness (Lee *et al.*, 2003) clearly map to the findings of this study. The perceived usefulness construct, which measures a technology's value to an individual, can explain why so many participants were motivated to use a meditation app for the perceived benefits they believed to be possible. In TAM, perceived usefulness and perceived ease of use are found to be sufficient enough to predict the use of a system (Chuttur, 2009). Nearly all participants, when asked what they would change about the meditation apps they had used, reported no desired changes to the design and user experience of the apps. This demonstrates strong perceived ease of use among most participants, which, when coupled with perceived benefits as a main motivator, can explain their motivations. This outcome falls in line with the results from Peng *et al.* (2016), in which perceived usefulness was mapped to participant sentiments about needing health apps to establish healthy habits. The theme of perceived benefits from the current study also falls in line with the results from Laurie & Blandford (2016), in which perceived consequences of using the app was a facilitator for use of Headspace. Additionally, this finding reflects similar outcomes as Ahtinen *et al.* (2013), in which perceived benefits was found to be a primary motivator for use of a mindfulness training app.

### Unified Theory of Acceptance and Usage of Technology

A number of constructs from UTAUT can be mapped to a number of themes from the current study. Facilitating conditions, which refers to an individual's perceptions of the resources and support available for technology use (Venkatesh *et al.*, 2012), describes why so many participants were motivated to use a meditation app because it had been subsidized by their employers. Interestingly, Peng *et al.* (2016) map the facilitating conditions construct to their finding that a lack of app literacy hinders health app use. This result demonstrates how poor facilitating conditions can lower motivations for use. The price value construct can explain why some participants were motivated towards certain apps due to price and turned away from others. Price value is consumers' cognitive tradeoff between the monetary cost for using the app and perceived benefits of the applications (Venkatesh *et al.*, 2012). Participants had differing opinions and beliefs of the perceived benefits of meditation apps. Some were more likely to pay for an annual app subscription, while others may have felt that the monetary cost was greater than the perceived benefits. This falls in line Peng *et al.* (2016), who report app cost as a hindering factor for health app use. Another UTAUT construct, hedonic motivation, can explain why participants turned to meditation apps in lieu of normal activities that had been shut down due to the pandemic. Hedonic motivation refers to the satisfaction or pleasure derived from using the technology (Venkatesh *et al.*, 2012). Those who suddenly found themselves lacking enjoyable, pleasure-inducing activities as a result of quarantine restrictions were likely more motivated to find replacements, and saw meditation apps as a



suitable, temporary yet novel alternative. Peng *et al.* (2016) find hedonic motivation to be a primary motivating theme, particularly for the younger generation. This finding is particularly relevant as the current study examined a population in the millennial age group.

### **Diffusion of Innovation Theory**

DOI focuses on the way and means by which an innovation is disseminated (Chang, 2010). Through social channels, the novelty of an innovation is communicated, and its use becomes more widespread. Innovation characteristics, a construct within DOI, is particularly relevant to the current study, as it explains why some technologies become successful, while others never become popular (Kaminski, 2011). One such characteristic of innovation is compatibility, referring to the degree to which the innovation is perceived to be consistent with perceived needs and socio-cultural values (Kaminski, 2011), which can explain why changes to living arrangements was a motivation for use. Meditation apps may have not fit into participants' pre-pandemic needs, but once lifestyles began to change as participants moved in with their parents or lost roommates, meditation apps became compatible with perceived needs. Changes to living arrangements support the findings that context of use may facilitate or hinder meditation app use (Laurie & Blandford, 2016). Observability, another construct within DOI, can be mapped to the theme of psychological conditions and worries. Observability refers to the degree to which the benefits of an innovation are apparent to potential adopters (Kaminski, 2011). Many participants who used meditation apps to manage symptoms of anxiety, stress, and insomnia did so because of recommendations from other users, or because of anecdotal evidence and general knowledge of the benefits. The results of meditation apps in managing these conditions were visible to participants prior to adoption, which was a primary motivator for many.

### **PRACTICAL IMPLICATIONS**

The constructs discussed in the previous section provide useful guidelines for the development of successful apps. Perceived benefits and observability of using a meditation app are a motivation for many participants. Thus, developers and marketers must seek to highlight these two constructs in order to adequately motivate users. While the design of the app needs to be more intuitive, the benefits should be observable to users (for instance, via user logs and weekly reports). The expectations of users in terms of perceived value must be met, otherwise usership will likely drop once the free trial period ends.

Facilitating conditions is another important construct that can be leveraged to promote usership. For some participants, having access to a subsidized annual subscription was the only motivation they needed to try the app. Of those who did not continue with usage, facilitating conditions can be further developed to promote user retention. For example, two participants reported a culture of mindfulness within their work environments, prior to the pandemic, with weekly scheduled meditation sessions and specific meditation rooms within their offices. These strong facilitating conditions had encouraged these participants to use their subsidized app subscriptions, and, over time, they had become more habitual users. Meditation app providers can promote stronger facilitating conditions through sponsored meditation sessions at work and via tie-up with mental health professionals. Employers can offer multiple app subscriptions to employees in order to cater to different individual needs.

Price was the only barrier to use that was discussed by several participants. Many expressed a desire for lower annual subscription prices, or subscriptions available on a monthly basis. Other participants expressed a desire for more health insurance companies to offer subsidized app subscriptions. Meditation app companies should take these suggestions into consideration when determining the pricing and subscription tiers. Interestingly, one participant even compared meditation apps with social services:

It would be interesting to see if this could be provided to more people as a social service, you know? I feel like if it helps mental health and overall health, then it's something that could ultimately drive down healthcare costs.

In light of the current Coronavirus pandemic, this sentiment is important. Millions of people across the world have lost their jobs due to the economic fallout of the pandemic, and the option to pay for an annual subscription to an app is now unattainable for many. Furthermore, levels of anxiety, depression, and stress are skyrocketing as healthcare systems become overburdened to their breaking points. Hence, policymakers may consider providing meditation apps as a social service to ensure wellbeing with justice (Krishnakumar & Nogales, 2015). Headspace has taken a lead in this regard by offering free premium subscription to the healthcare workers and those who lost jobs during the Coronavirus pandemic.

### **CONTRIBUTION, LIMITATIONS & FUTURE WORK**

The current study contributes to the literature in a number of ways. First, pre-existing users of meditation apps were recruited for the study to explore their motivations in a natural way. The participants were not asked to use an app specifically for the study, and because of this, the motivations and barriers for use that this study has captured reflect entirely personal, real-time decisions. Second, the study was conducted in the context of a global crisis, the current Coronavirus pandemic. The themes that were found to be motivations for use are job-related factors, changing lifestyles, psychological conditions and worries, and perceived outcomes, while price is the only theme that is both a motivator and barrier to use.

Certain limitations of this study are to be noted. The current study explores motivations in a population of millennial-aged educated individuals. Because of this, results cannot be generalized to the general population, especially older generations and less-educated individuals. Future studies can improve on this by recruiting a diverse population with a range of ages, occupations, socioeconomic statuses, and levels of education. Because of the nature of the study, participants were asked to

recall their experiences with meditation apps, potentially creating recall biases as they answered questions relating to their experiences. However, to counter this limitation, the researchers sought to limit recall bias by asking non-leading questions.

As the current study aims to explore motivations for and barriers to usage of meditation apps *during* times of crisis, it is impossible to predict if participants will continue to use meditation apps *after* the pandemic has subsided. In order for app developers and marketers to gauge long-term usage patterns through crises such as the Coronavirus pandemic, future studies may incorporate longitudinal research methods to examine motivations for usage in the post-pandemic society.

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